

UW-99501.ST25.txt
SEQUENCE LISTING

<110> Cox, Michael
Lusetti, Shelley
Eggler, Aimee

<120> RecA Mutants

<130> 960296.99501

<160> 5

<170> PatentIn version 3.2

<210> 1

<211> 335

<212> PRT

<213> Escherichia coli

<400> 1

Ala	Ile	Asp	Glu	Asn	Lys	Gln	Lys	Ala	Leu	Ala	Ala	Ala	Leu	Gly	Gln
1				5					10					15	

Ile	Glu	Lys	Gln	Phe	Gly	Lys	Gly	Ser	Ile	Met	Arg	Leu	Gly	Glu	Asp
			20					25					30		

Arg	Ser	Met	Asp	Val	Glu	Thr	Ile	Ser	Thr	Gly	Ser	Leu	Ser	Leu	Asp
		35					40					45			

Ile	Ala	Leu	Gly	Ala	Gly	Gly	Leu	Pro	Met	Gly	Arg	Ile	Val	Glu	Ile
	50					55					60				

Tyr	Gly	Pro	Glu	Ser	Ser	Gly	Lys	Thr	Thr	Leu	Thr	Leu	Gln	Val	Ile
65					70					75					80

Ala	Ala	Ala	Gln	Arg	Glu	Gly	Lys	Thr	Cys	Ala	Phe	Ile	Asp	Ala	Glu
				85					90					95	

His	Ala	Leu	Asp	Pro	Ile	Tyr	Ala	Arg	Lys	Leu	Gly	Val	Asp	Ile	Asp
			100					105					110		

UW-99501.ST25.txt

Asn Leu Leu Cys Ser Gln Pro Asp Thr Gly Glu Gln Ala Leu Glu Ile
 115 120 125

Cys Asp Ala Leu Ala Arg Ser Gly Ala Val Asp Val Ile Val Val Asp
 130 135 140

Ser Val Ala Ala Leu Thr Pro Lys Ala Glu Ile Glu Gly Glu Ile Gly
 145 150 155 160

Asp Ser His Met Gly Leu Ala Ala Arg Met Met Ser Gln Ala Met Arg
 165 170 175

Lys Leu Ala Gly Asn Leu Lys Gln Ser Asn Thr Leu Leu Ile Phe Ile
 180 185 190

Asn Gln Ile Arg Met Lys Ile Gly Val Met Phe Gly Asn Pro Glu Thr
 195 200 205

Thr Thr Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp
 210 215 220

Ile Arg Arg Ile Gly Ala Val Lys Glu Gly Glu Asn Val Val Gly Ser
 225 230 235 240

Glu Thr Arg Val Lys Val Val Lys Asn Lys Ile Ala Ala Pro Phe Lys
 245 250 255

Gln Ala Glu Phe Gln Ile Leu Tyr Gly Glu Gly Ile Asn Phe Tyr Gly
 260 265 270

Glu Leu Val Asp Leu Gly Val Lys Glu Lys Leu Ile Glu Lys Ala Gly
 275 280 285

Ala Trp Tyr Ser Tyr Lys Gly Glu Lys Ile Gly Gln Gly Lys Ala Asn
 290 295 300

UW-99501.ST25.txt

Ala Thr Ala Trp Leu Lys Asp Asn Pro Glu Thr Ala Lys Glu Ile Glu
305 310 315 320

Lys Lys Val Arg Glu Leu Leu Leu Ser Asn Pro Asn Ser Thr Pro
325 330 335

<210> 2
<211> 1011
<212> DNA
<213> Escherichia coli

<400> 2
atggctatcg acgaaaacaa acagaaagcg ttggcggcag cactgggcca gattgagaaa
60

caatttggtgta aaggctccat catgcgcctg ggtgaagacc gttcaatgga tgtggaaacc 1
20

atctctaccg gttcgctttc actggatata gcgcttgggg cagggtggtct gccgatgggc 1
80

cgtatcgctg agatctacgg accggaatct tccggtaaaa ccacgctgac gctgcaggtg 2
40

atcgccgcag cgcagcgtga aggtaaaacc tgtgcgttta tcgatgctga acacgcgctg 3
00

gacccaatct acgcacgtaa actgggagct gatatcgaca acctgctgtg ctcccagccg 3
60

gacaccggcg agcaggcact ggaaatctgt gacgccctgg cgcgttctgg cgcagtagac 4
20

gttatcgctg ttgactccgt ggcggcactg acgccgaaag cggaaatcga aggcgaaatc 4
80

ggcgactctc acatgggcct tgcggcacgt atgatgagcc aggcgatgcg taagctggcg 5
40

ggtaacctga agcagtcctc cacgctgctg atcttcatca accagatccg tatgaaaatt 6
00

ggtgtgatgt tcggtaaccc ggaaaccact accggtggta acgcgctgaa attctacgcc 6
60

UW-99501.ST25.txt

```

tctgttcgtc tcgacatccg tcgtatcggc gcggtgaaag agggcgaaaa cgtggtgggt    7
20

agcgaaaccc gcgtgaaagt ggtgaagaac aaaatcgctg cgccgtttta acaggctgaa    7
80

ttccagatcc tctacggcga aggtatcaac ttctacggcg aactgggtga cctgggcgta    8
40

aaagagaagc tgatcgagaa agcaggcgcg tggtagagct acaaagggtga gaagatcggt    9
00

cagggtaaag cgaatgcgac tgcctggctg aaagataacc cggaaccgc gaaagagatc    9
60

gagaagaaag tacgtgagtt gctgctgagc aaccggaact caacgccgta a            10
11

```

```

<210> 3
<211> 335
<212> PRT
<213> Escherichia coli

```

<400> 3

```

Ala Ile Asp Glu Asn Lys Gln Lys Ala Leu Ala Ala Ala Leu Gly Gln
1               5               10              15

```

```

Ile Glu Lys Gln Phe Gly Lys Gly Ser Ile Met Arg Leu Gly Glu Asp
                20              25              30

```

```

Arg Ser Met Asp Val Lys Thr Ile Ser Thr Gly Ser Leu Ser Leu Asp
        35              40              45

```

```

Ile Ala Leu Gly Ala Gly Gly Leu Pro Met Gly Arg Ile Val Glu Ile
50              55              60

```

```

Tyr Gly Pro Glu Ser Ser Gly Lys Thr Thr Leu Thr Leu Gln Val Ile
65              70              75              80

```

```

Ala Ala Ala Gln Arg Glu Gly Lys Thr Cys Ala Phe Ile Asp Ala Glu
                85              90              95

```

UW-99501.ST25.txt

His Ala Leu Asp Pro Ile Tyr Ala Arg Lys Leu Gly Val Asp Ile Asp
100 105 110

Asn Leu Leu Cys Ser Gln Pro Asp Thr Gly Glu Gln Ala Leu Glu Ile
115 120 125

Cys Asp Ala Leu Ala Arg Ser Gly Ala Val Asp Val Ile Val Val Asp
130 135 140

Ser Val Ala Ala Leu Thr Pro Lys Ala Glu Ile Glu Gly Glu Ile Gly
145 150 155 160

Asp Ser His Met Gly Leu Ala Ala Arg Met Met Ser Gln Ala Met Arg
165 170 175

Lys Leu Ala Gly Asn Leu Lys Gln Ser Asn Thr Leu Leu Ile Phe Ile
180 185 190

Asn Gln Ile Arg Met Lys Ile Gly Val Met Phe Gly Asn Pro Glu Thr
195 200 205

Thr Thr Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp
210 215 220

Ile Arg Arg Ile Gly Ala Val Lys Glu Gly Glu Asn Val Val Gly Ser
225 230 235 240

Glu Thr Arg Val Lys Val Val Lys Asn Lys Ile Ala Ala Pro Phe Lys
245 250 255

Gln Ala Glu Phe Gln Ile Leu Tyr Gly Glu Gly Ile Asn Phe Tyr Gly
260 265 270

Glu Leu Val Asp Leu Gly Val Lys Glu Lys Leu Ile Glu Lys Ala Gly
275 280 285

UW-99501.ST25.txt

Ala Trp Tyr Ser Tyr Lys Gly Glu Lys Ile Gly Gln Gly Lys Ala Asn
290 295 300

Ala Thr Ala Trp Leu Lys Asp Asn Pro Glu Thr Ala Lys Glu Ile Glu
305 310 315 320

Lys Lys Val Arg Glu Leu Leu Leu Ser Asn Pro Asn Ser Thr Pro
325 330 335

<210> 4

<211> 1011

<212> DNA

<213> Escherichia coli

<400> 4

atggctatcg acgaaaacaa acagaaagcg ttggcggcag cactgggcca gattgagaaa
60

caatttggtg aaggctccat catgcgcctg ggtgaagacc gttccatgga tgtgaaaacc 1
20

atctctaccg gttcgctttc actggatata gcgcttgggg caggtgggtct gccgatgggc 1
80

cgtatcgctg agatctacgg accggaatct tccggtaaaa ccacgctgac gctgcaggtg 2
40

atcgccgcag cgcagcgtga aggtaaaacc tgtgcgttta tcgatgctga acacgcgctg 3
00

gacccaatct acgcacgtaa actgggcgtc gatatcgaca acctgctgtg ctcccagccg 3
60

gacaccggcg agcaggcact ggaaatctgt gacgccctgg cgcgttcttg cgcagtagac 4
20

gttatcgctg ttgactccgt ggcggcactg acgccgaaag cggaaatcga aggcgaaatc 4
80

ggcgactctc acatgggcct tgcggcacgt atgatgagcc aggcgatgcg taagctggcg 5
40

ggtaacctga agcagtccaa cacgctgctg atcttcatca accagatccg tatgaaaatt 6

00

```

gggtgatgt tcggaaccc ggaaaccact accggtggta acgcgctgaa attctacgcc 6
60

tctgttcgtc tcgacatccg tcgtatcggc gcggtgaaag agggcgaaaa cgtgggtgggt 7
20

agcgaaaccc gcgtgaaagt ggtgaagaac aaaatcgctg cgccgtttta acaggctgaa 7
80

ttccagatcc tctacggcga aggtatcaac ttctacggcg aactggttga cctgggcgta 8
40

aaagagaagc tgatcgagaa agcaggcgcg tggtagagct acaaagggtga gaagatcgggt 9
00

cagggtaaag cgaatgcgac tgcttggtg aaagataacc cggaaccgc gaaagagatc 9
60

gagaagaaag tacgtgagtt gctgctgagc aaccgaact caacgccgta a 10
11

```

```

<210> 5
<211> 352
<212> PRT
<213> Escherichia coli

```

<400> 5

```

Ala Ile Asp Glu Asn Lys Gln Lys Ala Leu Ala Ala Ala Leu Gly Gln
1           5           10           15

```

```

Ile Glu Lys Gln Phe Gly Lys Gly Ser Ile Met Arg Leu Gly Glu Asp
20           25           30

```

```

Arg Ser Met Asp Val Glu Thr Ile Ser Thr Gly Ser Leu Ser Leu Asp
35           40           45

```

```

Ile Ala Leu Gly Ala Gly Gly Leu Pro Met Gly Arg Ile Val Glu Ile
50           55           60

```

```

Tyr Gly Pro Glu Ser Ser Gly Lys Thr Thr Leu Thr Leu Gln Val Ile

```

65

70

75

80

Ala Ala Ala Gln Arg Glu Gly Lys Thr Cys Ala Phe Ile Asp Ala Glu
 85 90 95

His Ala Leu Asp Pro Ile Tyr Ala Arg Lys Leu Gly Val Asp Ile Asp
 100 105 110

Asn Leu Leu Cys Ser Gln Pro Asp Thr Gly Glu Gln Ala Leu Glu Ile
 115 120 125

Cys Asp Ala Leu Ala Arg Ser Gly Ala Val Asp Val Ile Val Val Asp
 130 135 140

Ser Val Ala Ala Leu Thr Pro Lys Ala Glu Ile Glu Gly Glu Ile Gly
 145 150 155 160

Asp Ser His Met Gly Leu Ala Ala Arg Met Met Ser Gln Ala Met Arg
 165 170 175

Lys Leu Ala Gly Asn Leu Lys Gln Ser Asn Thr Leu Leu Ile Phe Ile
 180 185 190

Asn Gln Ile Arg Met Lys Ile Gly Val Met Phe Gly Asn Pro Glu Thr
 195 200 205

Thr Thr Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp
 210 215 220

Ile Arg Arg Ile Gly Ala Val Lys Glu Gly Glu Asn Val Val Gly Ser
 225 230 235 240

Glu Thr Arg Val Lys Val Val Lys Asn Lys Ile Ala Ala Pro Phe Lys
 245 250 255

Gln Ala Glu Phe Gln Ile Leu Tyr Gly Glu Gly Ile Asn Phe Tyr Gly

260

265

270

Glu Leu Val Asp Leu Gly Val Lys Glu Lys Leu Ile Glu Lys Ala Gly
 275 280 285

Ala Trp Tyr Ser Tyr Lys Gly Glu Lys Ile Gly Gln Gly Lys Ala Asn
 290 295 300

Ala Thr Ala Trp Leu Lys Asp Asn Pro Glu Thr Ala Lys Glu Ile Glu
 305 310 315 320

Lys Lys Val Arg Glu Leu Leu Leu Ser Asn Pro Asn Ser Thr Pro Asp
 325 330 335

Phe Ser Val Asp Asp Ser Glu Gly Val Ala Glu Thr Asn Glu Asp Phe
 340 345 350

SEQUENCE LISTING

<110> Cox, Michael

Lusetti, Shelley

Eggler, Aimee

<120> RecA Mutants

<130> 960296.99501

<160> 5

<170> PatentIn version 3.2

<210> 1

<211> 335

<212> PRT

<213> Escherichia coli

<400> 1

Ala Ile Asp Glu Asn Lys Gln Lys Ala Leu Ala Ala Ala Leu Gly Gln

1 5 10 15

Ile Glu Lys Gln Phe Gly Lys Gly Ser Ile Met Arg Leu Gly Glu Asp

20 25 30

Arg Ser Met Asp Val Glu Thr Ile Ser Thr Gly Ser Leu Ser Leu Asp

35 40 45

Ile Ala Leu Gly Ala Gly Gly Leu Pro Met Gly Arg Ile Val Glu Ile

50 55 60

Tyr Gly Pro Glu Ser Ser Gly Lys Thr Thr Leu Thr Leu Gln Val Ile
65 70 75 80

Ala Ala Ala Gln Arg Glu Gly Lys Thr Cys Ala Phe Ile Asp Ala Glu
 85 90 95

His Ala Leu Asp Pro Ile Tyr Ala Arg Lys Leu Gly Val Asp Ile Asp
 100 105 110

Asn Leu Leu Cys Ser Gln Pro Asp Thr Gly Glu Gln Ala Leu Glu Ile
 115 120 125

Cys Asp Ala Leu Ala Arg Ser Gly Ala Val Asp Val Ile Val Val Asp
 130 135 140

Ser Val Ala Ala Leu Thr Pro Lys Ala Glu Ile Glu Gly Glu Ile Gly
145 150 155 160

Asp Ser His Met Gly Leu Ala Ala Arg Met Met Ser Gln Ala Met Arg
 165 170 175

Lys Leu Ala Gly Asn Leu Lys Gln Ser Asn Thr Leu Leu Ile Phe Ile
 180 185 190

Asn Gln Ile Arg Met Lys Ile Gly Val Met Phe Gly Asn Pro Glu Thr
 195 200 205

Thr Thr Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp

210 215 220

Ile Arg Arg Ile Gly Ala Val Lys Glu Gly Glu Asn Val Val Gly Ser

225 230 235 240

Glu Thr Arg Val Lys Val Val Lys Asn Lys Ile Ala Ala Pro Phe Lys

245 250 255

Gln Ala Glu Phe Gln Ile Leu Tyr Gly Glu Gly Ile Asn Phe Tyr Gly

260 265 270

Glu Leu Val Asp Leu Gly Val Lys Glu Lys Leu Ile Glu Lys Ala Gly

275 280 285

Ala Trp Tyr Ser Tyr Lys Gly Glu Lys Ile Gly Gln Gly Lys Ala Asn

290 295 300

Ala Thr Ala Trp Leu Lys Asp Asn Pro Glu Thr Ala Lys Glu Ile Glu

305 310 315 320

Lys Lys Val Arg Glu Leu Leu Leu Ser Asn Pro Asn Ser Thr Pro

325 330 335

<210> 2

<211> 1011

<212> DNA

<213> Escherichia coli

<400> 2

atggctatcg acgaaaacaa acagaaagcg ttggcggcag cactgggccca gattgagaaa 60
 caatttgga aaggctccat catgcgcctg ggtgaagacc gttcaatgga tgtggaaacc 120
 atctctaccg gtctgcttc actggatc gcgctgggg caggtggtct gccgatgggc 180
 cgtatcgtcg agatctacgg accggaatct tccggtaaaa ccacgctgac gctgcagggt 240
 atcgccgcag cgcagcgtga aggtaaaacc tgtgcgttta tcgatgctga acacgcgctg 300
 gacccaatct acgcacgtaa actgggcgtc gatcgcaca acctgctgtg ctccagccg 360
 gacaccggcg agcaggcact ggaaatctgt gacgccctgg cgcttctgg cgagtagac 420
 gtatcgtcg ttactccgt ggcggcactg acgccgaaag cggaaatcga aggcgaaatc 480
 ggcgactctc acatgggcct tgcggcacgt atgatgagcc aggcgatgcg taagctggcg 540
 ggtaacctga agcagtccaa cacgctgctg atctcatca accagatccg tatgaaaatt 600
 ggtgtgatgt tcgtaacct ggaaaccact accggtggta acgcgctgaa attctacgcc 660
 tctgtctgc tcgacatccg tcgatcggc gcggtgaaag agggcgaaaa cgtggtgggt 720
 agcgaaacct gcgtgaaagt ggtgaagaac aaaatcgctg cgccgttaa acaggctgaa 780
 ttccagatcc tctacggcga aggtatcaac ttctacggcg aactggtga cctgggcgta 840
 aaagagaagc tgatcgagaa agcaggcgcg tggtagctg acaaaggta gaagatcgg 900
 cagggtaaag cgaatgcgac tgctggctg aaagataacc cggaaccgc gaaagagatc 960
 gagaagaaag tacgtgagtt gctgctgagc aaccgaact caacgccgta a 1011

<210> 3

<211> 335

<212> PRT

<213> Escherichia coli

<400> 3

Ala Ile Asp Glu Asn Lys Gln Lys Ala Leu Ala Ala Ala Leu Gly Gln

1 5 10 15

Ile Glu Lys Gln Phe Gly Lys Gly Ser Ile Met Arg Leu Gly Glu Asp

20 25 30

Arg Ser Met Asp Val Lys Thr Ile Ser Thr Gly Ser Leu Ser Leu Asp

35 40 45

Ile Ala Leu Gly Ala Gly Gly Leu Pro Met Gly Arg Ile Val Glu Ile

50 55 60

Tyr Gly Pro Glu Ser Ser Gly Lys Thr Thr Leu Thr Leu Gln Val Ile

65 70 75 80

Ala Ala Ala Gln Arg Glu Gly Lys Thr Cys Ala Phe Ile Asp Ala Glu

85 90 95

His Ala Leu Asp Pro Ile Tyr Ala Arg Lys Leu Gly Val Asp Ile Asp

100 105 110

Asn Leu Leu Cys Ser Gln Pro Asp Thr Gly Glu Gln Ala Leu Glu Ile

115 120 125

Cys Asp Ala Leu Ala Arg Ser Gly Ala Val Asp Val Ile Val Val Asp
130 135 140

Ser Val Ala Ala Leu Thr Pro Lys Ala Glu Ile Glu Gly Glu Ile Gly
145 150 155 160

Asp Ser His Met Gly Leu Ala Ala Arg Met Met Ser Gln Ala Met Arg
165 170 175

Lys Leu Ala Gly Asn Leu Lys Gln Ser Asn Thr Leu Leu Ile Phe Ile
180 185 190

Asn Gln Ile Arg Met Lys Ile Gly Val Met Phe Gly Asn Pro Glu Thr
195 200 205

Thr Thr Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp
210 215 220

Ile Arg Arg Ile Gly Ala Val Lys Glu Gly Glu Asn Val Val Gly Ser
225 230 235 240

Glu Thr Arg Val Lys Val Val Lys Asn Lys Ile Ala Ala Pro Phe Lys
245 250 255

Gln Ala Glu Phe Gln Ile Leu Tyr Gly Glu Gly Ile Asn Phe Tyr Gly
260 265 270

Glu Leu Val Asp Leu Gly Val Lys Glu Lys Leu Ile Glu Lys Ala Gly

275 280 285

Ala Trp Tyr Ser Tyr Lys Gly Glu Lys Ile Gly Gln Gly Lys Ala Asn

290 295 300

Ala Thr Ala Trp Leu Lys Asp Asn Pro Glu Thr Ala Lys Glu Ile Glu

305 310 315 320

Lys Lys Val Arg Glu Leu Leu Leu Ser Asn Pro Asn Ser Thr Pro

325 330 335

<210> 4

<211> 1011

<212> DNA

<213> Escherichia coli

<400> 4

atggctatcg acgaaaacaa acagaaagcg ttggcggcag cactgggcca gattgagaaa 60

caatttggtg aaggctccat catgcgctg ggtgaagacc gttccatgga tgtgaaaacc 120

atctctaccg gttcgcttgc actggatata gcgcttgggg caggtgggtc gccgatgggc 180

cgtatcgctg agatctacgg accggaatct tccggtaaaa ccacgctgac gctgcagggtg 240

atcgccgcag cgcagcgtga aggtaaaacc tgtgcgttta tcgatgctga acacgcgctg 300

gacccaatct acgcacgtaa actggggcgtc gatatacgaca acctgctgtg ctcccagccg 360

gacaccggcg agcaggcact ggaaatctgt gacgccctgg cgcgttctgg cgcagtagac 420

gttatcgctg ttgactccgt ggcggcactg acgccgaaag cggaaatcga aggcgaaatc 480

ggcgactctc acatgggcct tgcggcacgt atgatgagcc aggcgatgcg taagctggcg 540
 ggtaacctga agcagtgcaa cacgctgctg atcttcatca accagatccg tatgaaaatt 600
 ggtgtgatgt tcggaaccc ggaaccact accggtgga acgcgctgaa attctacgcc 660
 tctgttcgtc tcgacatccg tcgtatcggc gcggtgaaag agggcgaaaa cgtggtgggt 720
 agcgaaaccc gcgtgaaagt ggtgaagaac aaaatcgctg cgccgtttaa acaggctgaa 780
 ttccagatcc tctacggcga aggtatcaac ttctacggcg aactggtga cctgggcgta 840
 aaagagaagc tgatcgagaa agcaggcgcg tggtagagct acaaaggta gaagatcgg 900
 cagggtaaag cgaatcgac tgcctggctg aaagataacc cggaaccgc gaaagagatc 960
 gagaagaaag tacgtgagtt gctgctgagc aaccggaact caacgccgta a 1011

<210> 5

<211> 352

<212> PRT

<213> Escherichia coli

<400> 5

Ala Ile Asp Glu Asn Lys Gln Lys Ala Leu Ala Ala Leu Gly Gln

1 5 10 15

Ile Glu Lys Gln Phe Gly Lys Gly Ser Ile Met Arg Leu Gly Glu Asp

20 25 30

Arg Ser Met Asp Val Glu Thr Ile Ser Thr Gly Ser Leu Ser Leu Asp

35 40 45

Ile Ala Leu Gly Ala Gly Gly Leu Pro Met Gly Arg Ile Val Glu Ile
50 55 60

Tyr Gly Pro Glu Ser Ser Gly Lys Thr Thr Leu Thr Leu Gln Val Ile
65 70 75 80

Ala Ala Ala Gln Arg Glu Gly Lys Thr Cys Ala Phe Ile Asp Ala Glu
85 90 95

His Ala Leu Asp Pro Ile Tyr Ala Arg Lys Leu Gly Val Asp Ile Asp
100 105 110

Asn Leu Leu Cys Ser Gln Pro Asp Thr Gly Glu Gln Ala Leu Glu Ile
115 120 125

Cys Asp Ala Leu Ala Arg Ser Gly Ala Val Asp Val Ile Val Val Asp
130 135 140

Ser Val Ala Ala Leu Thr Pro Lys Ala Glu Ile Glu Gly Glu Ile Gly
145 150 155 160

Asp Ser His Met Gly Leu Ala Ala Arg Met Met Ser Gln Ala Met Arg
165 170 175

Lys Leu Ala Gly Asn Leu Lys Gln Ser Asn Thr Leu Leu Ile Phe Ile
180 185 190

Asn Gln Ile Arg Met Lys Ile Gly Val Met Phe Gly Asn Pro Glu Thr
195 200 205

Thr Thr Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp
210 215 220

Ile Arg Arg Ile Gly Ala Val Lys Glu Gly Glu Asn Val Val Gly Ser
225 230 235 240

Glu Thr Arg Val Lys Val Val Lys Asn Lys Ile Ala Ala Pro Phe Lys
245 250 255

Gln Ala Glu Phe Gln Ile Leu Tyr Gly Glu Gly Ile Asn Phe Tyr Gly
260 265 270

Glu Leu Val Asp Leu Gly Val Lys Glu Lys Leu Ile Glu Lys Ala Gly
275 280 285

Ala Trp Tyr Ser Tyr Lys Gly Glu Lys Ile Gly Gln Gly Lys Ala Asn
290 295 300

Ala Thr Ala Trp Leu Lys Asp Asn Pro Glu Thr Ala Lys Glu Ile Glu
305 310 315 320

Lys Lys Val Arg Glu Leu Leu Leu Ser Asn Pro Asn Ser Thr Pro Asp
325 330 335

Phe Ser Val Asp Asp Ser Glu Gly Val Ala Glu Thr Asn Glu Asp Phe

340

345

350